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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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11/28/2001

KENYON & KENYON
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER

RUTHKOSKY, MARK

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1745

DATE MAILED: 11/28/2001

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/232,498

Applicant(s)

MIZUNO, SEIJI

Examiner

Mark X. Ruthkosky

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4, 9 and 10 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8, 11 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

Summary

1. Claims 1-12 are pending.

Claim Rejections - 35 U.S.C. § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-3, 5-8 and 11-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The amended claim language of claim 1 which reads “such that the generation of a reaction byproduct gas is minimized” is indefinite as it is a relative statement. It is not clear what the byproduct gas is and therefore, it cannot be ascertained as to what the comparison for minimization may be. It is minimized as compared with or relative to what standard?

Claim Rejections - 35 U.S.C. § 103

4. Claims 1-3, 5-8 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandelli et al. (US 4,643,956), in view of JP 59042781.

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The instant claims are to a method of manufacturing a separator for a fuel cell comprising the steps of mixing a carbon, an epoxy resin and a phenolic resin, charging the material into a mold and heat pressing the material.

Sandelli et al. (US 4,643,956) teaches a process for producing (col. 4 and examples) a separator plate for fuel cells which includes an electrode substrate and separator assembly where the process includes supplying materials into a mold comprising a carbon (carbon particles of 50 microns or less, see col. 3, lines 1-50), and a binder (can be phenol resins, including novolacs, see claim 3, col. 3-4 and examples.) While this process teaches the binder can be a mixture of phenolic resins, it does not teach a process for mixing phenolic resins and epoxy resins to form a separator (col. 20, line 10).

JP 59042781 (abstract), however, teaches a method for producing a carbon separator material for a fuel cell comprising the steps of mixing a carbon powder, an epoxy resin and a phenolic resin, charging the material into a mold and heat pressing the material. Novolac phenol resins are disclosed. The carbon is graphite less than 100 microns in size.

It would be obvious to one skilled in the art at the time the invention was made to combine the molding composition which is presented in JP 59042781 as the binder of Sandelli et al. (US 4,643,956) as the materials are well known to be mixed and bind carbon to form separators for fuel cells. The chemical resistance, heat resistance and gas impermeability of the material are improved. The use of such carbonaceous materials, is very well known in fuel cell assemblies.

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As the epoxy resin is reacted with the phenolic resin, one of ordinary skill in the art would have the knowledge to choose to react the functional groups in about a 1:1 stoichiometry as the reaction will go to completion and form the desired product. It is also obvious to one of ordinary skill in the art to use cresol novolak and bisphenol A type epoxy resins as the epoxy resin binder in a fuel cell, and resol phenolic resins as the phenol resin binder in a fuel cell. These specific resins are commonly used in the art as binders (see Hasegawa US 4,369,238, claim 2; and Sugaya US 5,128,378, col. 4, lines 60+ as examples.) for polymeric separators in electrochemical devices. The applicant argues that the phenol resin having an epoxy group is not an epoxy resin and that the addition of the epoxy resin to a phenol is not the same as a process of mixing both types of resin to form a separator. It is clearly shown in the translated example that a paravinylphenol polymer is mixed with a novolak type phenol with an epoxy group to form a resin solution which is added to a carbon powder. This argument is not persuasive.

Allowable Subject Matter

5. Claims 4, 9, and 10 allowed.
6. The following is an examiner's statement of reasons for allowance:

The limitations in these dependent claims, including the use of glycidylamine as the epoxy resin, the method steps including particle sizes by spraying and drying and the step of grinding, are not taught with the process steps shown in the art. Thus, the claims are indicated as allowable.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

7. Applicant's arguments filed 3/6/2001 have been fully considered but they are not persuasive.

The Sandelli et al. (US 4,643,956) reference is used to show a process for producing an separator assembly for fuel cells where the process includes supplying materials into a mold comprising carbon particles and a binder. While this process teaches the binder can be phenol resins, it does not specifically teach a process for mixing epoxy resins and phenol resins to form a separator. Tsunoda (JP 59042781) is used to support the method of Sandelli et al. (US 4,643,956) as it also teaches a method for producing a carbon material separator for a fuel cell comprising the steps of mixing a carbon powder, an epoxy resin and a phenolic resin, charging the material into a mold and heat pressing the material. The specific method uses a vinyl phenol and a condensate novolac type phenol resin initial condensate having an epoxy group. These materials include the three components necessary in the mixture, carbon powder, an epoxy resin and a phenolic resin, and therefore, do support the Sandelli et al. (US 4,643,956) reference. The use of the epoxy and phenolic materials are known in the art as further supported by Hasegawa


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US 4,369,238, claim 2; Shigita (US 4,956,131), as previously applied, and Sugaya US 5,128,378, col. 4, lines 60+ as examples.

Examiner Correspondence

8. Any inquiry regarding this communication or a previous communication should be directed to Examiner Mark Ruthkosky, Ph.D., whose telephone number is (703) 305-0587 or his supervisor, Gabrielle Brouillette, Ph.D., whose phone number is (703) 308-0756. Please note that Examiner Ruthkosky is out of the office the first Friday of each bi-week period.

The art unit 1745 unofficial fax number is 703-306-3186, while the PTO official fax number is 703-305-3599.


GABRIELLE BROUILLETTE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700